

NOTES ON FISHES FROM BOMBAY

BY

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The fishes noted below were submitted to me by the Bombay Natural History Society in 1925. Though none are new to science several are of special taxonomic interest. Descriptive notes are also given of others with the idea of recording variation. The sequence of characters, formulas, etc., is the same as given in my late paper in South African Fishes.¹ The explanation in the introductory remarks of that paper will likewise apply here. The collection will be returned to the Bombay Society and with their permission a set of duplicates retained by the Academy.

EULAMIDÆ

Scoliodon acutus (Rüppell.)

Two examples, 265 and 270 mm. They appear to agree with the example I described from Baram, British North Borneo.² They also agree with Day's figure. The back and upper surface nearly olive-gray and the lower surface creamy.

RHINOBATIDÆ

Rhinobatus rhinobatus (Linné.)

Disk width $1\frac{1}{3}$ its length; snout rather broad, as seen from above profiles slightly concave and end rather broadly rounded, length about $2\frac{1}{4}$ in disk length; eye equals space between interorbital ridges; mouth nearly straight; internarial space $\frac{2}{3}$ of nostril length, which $1\frac{2}{3}$ in mouth width; spiracle nearly large as eye, with two papillæ on hind edge. Row of fine close-set tubercles, about fifteen over each eye and two over spiracle; row of small close-set tubercles from middle of back to first dorsal, continued less distinctly between dorsals; two groups of small tubercles at each shoulder; scales very fine. Dorsals small, sub-equal.

Nearly uniform ecru-drab to vinaceous or light cinnamon above, with narrow lighter border all around disk and tail. Undersurface of body creamy, soiled with drab or pale brown.

Two examples, 253 and 263 mm.

TORPEDINIDÆ

Torpedo sinus-persici (Olfers.)

Disk sub-circular, length $1\frac{1}{10}$ its width; snout short, much greater than interorbital, nearly straight across front profile as seen from above; eye less than spiracle, 2 in level of interorbital; mouth small, width $1\frac{2}{3}$ to $1\frac{3}{4}$ to front profile; teeth small, in about twenty rows in each jaw; internasal 1 to $1\frac{1}{2}$ in mouth width. Spiracle eye-diameter behind eye, with eight or nine fleshy marginal tentacles behind. Skin smooth. Dorsals small, inner angles rounded; origin of first before hind basal edge of ventral and base end well behind ventral base; tail $2\frac{1}{2}$ in total length; with small low fold each side; hind caudal edge convex.

Nearly fawn-colour above, with large-dusky to dusky-black blotches, not sharply defined, close-set, more or less uniform and all nearly twice larger

¹ *Proc. Acad. Nat. Sci. Phila.*, 77, 1925, pp. 187-268.

² *Ibid.*, 1905, p. 458.

than eyes or spiracles. None extend in dorsals or caudal or have faded ? from caudal peduncle and also not very distinct on ventrals. Lower surface whitish, with light brown around edges of disk.

Two examples, 140 and 143 mm. compared with *Torpedo panthera* from Natal¹ the entirely different colour-pattern seems to be distinctive. This agrees with Garman's² description, though the figure by Sauvage² shows the spots much smaller and pale.

CLUPEIDÆ

Hilsa blochii (Valenciennes.)

Depth 3; head $3\frac{3}{8}$, width $2\frac{1}{8}$. Snout $3\frac{3}{8}$; eye 6, with broad adipose lids $1\frac{1}{2}$ in snout, $1\frac{1}{2}$ in interorbital; maxillary reaches opposite hind eye edge, with broad supplemental bone, length $2\frac{1}{2}$ in head, expansion $1\frac{1}{2}$ in eye; front of upper jaw well notched; interorbital $4\frac{1}{4}$ in head, convexly elevated; cheek deep, with fine vertical striæ; opercle finely, though obsoletely striate. Gill-rakers about 32 + 70, very slender, fine, much longer than gill filaments or equal snout.

Scales 42, of which last 4 in caudal base, 14 transversely, 15 predorsal; each with 6 to 9 transverse or vertical striæ; scutes 16 + 12; suprascapular region venulose. D. III, 14, 1, first branched ray $1\frac{3}{8}$ in head; A. III, 17, 1, first branched ray 4; caudal strongly forked, $3\frac{1}{4}$ in combined head and body; least depth of caudal peduncle $2\frac{3}{4}$ in head; pectoral $1\frac{1}{3}$, axillary scale $2\frac{1}{2}$ in its length; ventral $2\frac{1}{2}$ in head.

Black light olive, with deep blue and silvery reflections. Each scale above with dusky vertical streak terminally. Sides of head and body silver-white. Adipose region of eye pale. Fins all pale, front edge of dorsal and edges of upper caudal lobe grayish. Along upper side of back traces of 6 or 7 obscure neutral or dusky blotches.

One example, 320 mm. agrees with Day's figure of *Clupea kanayurta*.³ Weber and Beaufort give the gill-rakers as 88 in an example 210 mm.

Ilisha indica (Swainson.)

Depth $2\frac{5}{8}$; head $3\frac{3}{4}$, width 2. Snout $3\frac{1}{2}$ from snout tip; eye 3, with adipose-lids, longer than snout or interorbital; maxillary reaches opposite first third of eye, with anterior ligament along front edge, $2\frac{1}{2}$ in head from snout tip; interorbital 6, but little elevated. Gill-rakers 12 + 24, lanceolate.

Scales 41, transversely 13, predorsal 16; each scale with 10 transverse vertical striæ, though only last complete; scutes 18 + 9. D. III, 13?, first branched ray $1\frac{1}{2}$ in total head length; A. II, 36, 1, first branched ray $2\frac{3}{4}$; least depth of caudal peduncle $2\frac{3}{8}$; pectoral $1\frac{1}{4}$; ventral $4\frac{1}{2}$.

Back olivaceous, sides and below bright silvery-white. Fins pale, dorsal and caudal dusted with grayish.

One example 250 mm.

SYNODONTIDÆ

Saurida tumbil (Bloch.)

Depth $5\frac{1}{3}$; head $3\frac{3}{8}$, width $2\frac{1}{10}$. Snout 5; eye $6\frac{1}{4}$, $1\frac{1}{4}$ in snout, $1\frac{2}{8}$ in interorbital; maxillary $1\frac{1}{2}$ in head; interorbital $4\frac{1}{2}$. Gill-rakers row of minute, uniform, close-set, numerous points.

Scales 52-4 in lateral line, slight keel along side of caudal peduncle, 5 above 6 below, 21 predorsal; scales with 2 to 10 basal, short, marginal striæ; circuli very fine, D. II, 10, 1, first short branched ray $1\frac{1}{2}$ in head; A. II, 9, 1, first branched ray $3\frac{1}{2}$; caudal forked, $1\frac{1}{2}$; least depth of caudal peduncle $4\frac{2}{8}$; pectoral $2\frac{1}{10}$; ventral $1\frac{2}{8}$.

Back brown, below soiled whitish. Iris yellowish-brown. Dorsal deep brown terminally, also caudal. Anal whitish. Paired fins largely dusky-gray, pectoral whitish or creamy basally.

One example, 300 mm.

¹ *Proc. Acad. Nat. Sci. Phila.*, 1925, p. 193.

² *Hist. Nat. Madagascar, Poiss.*, 1891, p. 3, Pl. I.

³ *Fishes of India*, 1878, p. 640, Pl. 162, Fig. 4.

Harpodon nehereus (Buchanan-Hamilton.)

Depth 6; head $4\frac{1}{2}$, width $3\frac{3}{8}$, snout $7\frac{3}{8}$ from snout tip; eye $1\frac{1}{2}$ in snout; maxillary $1\frac{1}{2}$ in head; interorbital $4\frac{1}{4}$. Gill-rakers about 11 + 11 groups of small spines, of which enlarged one to each group.

Scales 40 + 8 in lateral line; very thin and caducous; circuli 7 to 21 + 18 to 26. D. II, 10, first branched ray $1\frac{1}{10}$ in total head length; A. II, 12, first branched ray $1\frac{1}{2}$; caudal emarginate, with short median point, equals head; least depth of caudal peduncle $5\frac{3}{8}$; pectoral to first third of dorsal base, $3\frac{3}{8}$ in combined head and body; ventral reaches anal, or $3\frac{3}{8}$.

Upper edge of back heliotrope-purple, sides and below vinaceous-buff. Tail dusted with brown. Dorsal, anal and caudal dusted brownish, other fins pale. One example, 242 mm.

PLEURONECTIDÆ

Pseudorhombus russellii, Gray.

Depth $1\frac{1}{2}$ to $1\frac{3}{4}$; head 3 to $3\frac{1}{8}$, width $4\frac{1}{8}$ to $4\frac{3}{8}$. Snout tip to lower eye $4\frac{1}{2}$ to 5 in head from snout tip; lower eye 4 to $4\frac{1}{8}$; maxillary $2\frac{2}{8}$ to $2\frac{1}{2}$, expansion $1\frac{3}{8}$ to 2 in lower eye, reaches opposite middle of lower eye. Gill-rakers 8 + 15, lanceolate, slender, little shorter than gill-filaments.

Scales 65 to 67 in lateral line to caudal base, arch $2\frac{1}{8}$ to $2\frac{1}{2}$ in straight section; 15 or 16 scales above arch, 29 or 30 below straight section; row of fine scales on membranes of dorsal and anal between each fin ray and fin bases also scaly; scales of left side with 10 to 14 basal radiating striæ, apical denticles 25 to 28, with 2 or 3 transverse series of basal elements and circuli fine. D. 66 to 69, height $2\frac{1}{2}$ to $2\frac{3}{8}$, in total head length; A. 51 to 53, height $2\frac{1}{2}$ to $2\frac{7}{8}$; caudal pointed medially behind, $1\frac{1}{8}$ to $1\frac{3}{8}$; least depth of caudal peduncle $2\frac{1}{2}$ to 3; pectoral $1\frac{3}{8}$ to $1\frac{3}{4}$; ventral $2\frac{3}{8}$ to $2\frac{1}{2}$.

Left side drab-gray, marked with variable, scattered, darker rings, none larger than eye. Iris grayish. Fins pale gray-brown, with dark, scattered, irregular, variable spots. Pectoral and ventral grayish. Right side whitish, dark spots on vertical fins showing pale in terminal portions. Paired fins whitish.

Seven examples, 115 to 137 mm.

SOLEIDÆ

Cynoglossus macrolepidotus (Bleeker.)

Depth 4 to $4\frac{2}{5}$; head $3\frac{2}{5}$ to $4\frac{1}{5}$, width $4\frac{3}{8}$ to 6. Snout to upper eye $2\frac{1}{2}$ to $2\frac{3}{4}$; upper eye $9\frac{1}{4}$ to $11\frac{1}{4}$, advanced nearly half its diameter from lower eye; mouth-cleft $4\frac{3}{8}$ to $4\frac{1}{4}$, moderately arched, rictus reaches little beyond lower eye, lips moderate. No gill-rakers.

Scales 55 to 57 in median lateral line to caudal base, 8 above median to upper, 11 below to lower body edge; no lateral line on right side; left scales with 61 to 70 basal radiating striæ, apical denticles 38 to 44 with 7 or 8 transverse series of basal elements and circuli minute; right scales with 61 to 66 basal radiating striæ; scales small on head, along body edges and out over caudal basally, forming low basal sheaths to dorsal and anal. Dorsal 113 to 115, height 4 to 5 in head; A, 84 to 92, height $3\frac{1}{2}$ to 5; caudal $2\frac{1}{10}$ to $2\frac{1}{8}$, pointed.

Left side mummy-brown, each scale with vertical brown bar subterminally. Irides slaty. Vertical fins with deep brownish terminally. Right side uniform cream-white.

Two examples, 278 mm

SPHYRÆNIDÆ

Sphyræna barracuda (Walbaum.)

Depth $5\frac{3}{4}$; head $2\frac{3}{4}$, width 3. Snout $2\frac{1}{4}$ from snout tip; eye $4\frac{7}{8}$, $2\frac{1}{8}$ in snout, greater than interorbital; maxillary reaches $\frac{4}{8}$ to eye, expansion $\frac{3}{8}$ in eye, length $2\frac{3}{8}$ in head from snout tip; lower teeth vertically erect; interorbital $5\frac{3}{8}$; preopercle ridge obtuse or rounded. Gill-rakers 2, short, lanceolate points, on lower branch of first arch.

Scales 78 + 9, 8 above to soft dorsal origin, 10 below, 23 predorsal to occiput. D. V.—II, 6, second spine $2\frac{1}{2}$ in total head length, first branched ray

3; A. II, 7, first branches ray $3\frac{1}{8}$; caudal $1\frac{7}{8}$, forked; least depth of caudal peduncle $4\frac{1}{8}$; pectoral $2\frac{1}{8}$; ventral $2\frac{4}{8}$.

Back brown, lower sides and under surface silvery-white, Iris largely silvery. Dorsals and caudal brownish, other fins whitish.

One example, 275 mm.

POLYNEMIDÆ

Polydactylus plebejus (Broussonet.)

Depth 3 to $3\frac{2}{5}$; head 3 to $3\frac{1}{4}$, width $2\frac{1}{6}$ to $2\frac{1}{4}$. Snout $5\frac{4}{5}$ to 6; eye $4\frac{1}{4}$ to $4\frac{3}{5}$, greater than snout, $1\frac{1}{10}$ to $1\frac{1}{5}$ in interorbital; maxillary from its own tip $1\frac{2}{5}$ to 2 in head from snout tip, expansion $1\frac{1}{2}$ to $1\frac{4}{5}$ in eye; interorbital $4\frac{1}{5}$ to $5\frac{1}{5}$, broadly convex. Gill-rakers 10 + 15 lanceolate, longer than gillfilaments or $1\frac{1}{2}$ in eye.

Scales 55 to 62 + 17 to 20, 8 above, 11 or 12 below, 32 to 34 predorsal. D. VIII—1, 13, 1, third spine $1\frac{1}{2}$ to $1\frac{3}{5}$ in head, first ray $1\frac{1}{2}$ to $1\frac{3}{5}$; A. II, 11, second spine $3\frac{2}{5}$ to 5, first ray $1\frac{3}{4}$ to 2; caudal deeply emarginate, upper lobe longer, $2\frac{2}{5}$ to $2\frac{4}{5}$ in combined head and body; least depth of caudal peduncle $2\frac{1}{5}$ to $2\frac{1}{5}$ in head, pectoral $1\frac{1}{5}$ to $1\frac{2}{5}$, with 5 filaments, upper longest and reaches little beyond ventrals but not to anal; ventral 2 in head.

Olive-brown above, paler to whitish below. Dorsals neutral-black terminally and anal dusted with neutral terminally. Hind caudal edge dusted narrowly with neutral dusky. Pectoral largely neutral-black. Ventral whitish.

Three examples, 228 to 278 mm. They agree with Günther's figure¹ except the dark longitudinal streaks are not evident in my examples.

Polydactylus sextarius (Bloch.)

Depth 3; head $2\frac{3}{4}$, width $2\frac{3}{8}$. Snout $5\frac{1}{5}$; eye $4\frac{3}{5}$, greater than snout, $1\frac{1}{4}$ in interorbital; maxillary from tip $2\frac{1}{5}$ in head from snout tip, expansion 2 in eye; interorbital $3\frac{3}{5}$ in head, broadly convex. Gill-rakers 16 + 19, lanceolate; longer than gill-filaments or $1\frac{1}{2}$ in eye.

Scales 42 + 4 in lateral line, 6 above, 10 below, 15 predorsal; basal radiating striæ 3, 86 small weak apical spines with 15 to 17 transverse series of basal elements and circuli very fine. D. VIII—1, 12, 1, third spine $1\frac{2}{5}$ in head, first ray $1\frac{3}{4}$? A. II, 13, 1, second spine $4\frac{3}{5}$, first ray 2; caudal deeply forked, $2\frac{1}{2}$ in combined head and body; least depth of caudal peduncle $2\frac{1}{2}$ in head; pectoral $1\frac{1}{2}$, filaments asymmetrical as 7 right and 6 left, extend back beyond depressed pectoral though not quite so far as tips of depressed ventral; ventral $1\frac{2}{5}$ in head.

Body largely brown, with pale or dull yellowish tinge, especially below. On lateral line from third to sixth scale ellipsoid dusky or blackish blotch. Ends of dorsals and anals dusted with brown. Pectoral neutral-dusky terminally and ventral brownish terminally.

One example 250 mm.

CARANGIDÆ

Seriola nigrofasciata (Rüppell.)

Depth 3; head $3\frac{2}{5}$, width 2. Snout $3\frac{1}{10}$ from snout tip; eye $4\frac{4}{5}$, $1\frac{2}{5}$ in snout, $1\frac{1}{4}$ in interorbital; maxillary reaches opposite hind pupil edge, expansion 2 in eye, length 2 in head from snout tip; jaw teeth in broad bands, simple, conic, outer row enlarged, in about 5 series; no teeth on vomer or tongue; interorbital 3, convex; opercle with rather weak, fine, radiating striæ. Gill-rakers 1 + 8, short, low, strong, mostly rudimentary.

Scales about 90 in lateral line to caudal base, irregular, 16 above, 20 below, 25 predorsal to occiput; 5 weak basal radiating striæ and complete circuli moderate. D. V—1, 32, 1, third spine $5\frac{1}{10}$ in total head length, first branched ray 2; A. I, 16, 1, first branched ray $2\frac{2}{5}$; caudal deeply lunate, $4\frac{1}{5}$; least depth of caudal peduncle 5; pectoral $1\frac{1}{4}$; ventral $1\frac{1}{4}$.

¹ *Journ. Mus. Godeffroy*, 4, 1875, p. 103, Pl. 77, Fig. A.

Dusky-brown generally, with grayish tinge on body above and under-surface soiled brownish. Back with 5 broad, rather oblique, obscure, dusky cross-bands. Fins largely dusky, tip of soft dorsal whitish. Pectoral pale brown. Ventral blackish. Iris brown, with yellowish tinge.

One example 240 mm.

Caranx djeddaba (Forsk.)

Depth $2\frac{7}{8}$ to 3; head $3\frac{1}{4}$, width $1\frac{1}{2}$ to 2. Snout $3\frac{2}{3}$ to $3\frac{3}{8}$ from snout up; eye $4\frac{1}{5}$ to 5, $1\frac{1}{4}$ to $1\frac{2}{3}$ in snout, $1\frac{1}{3}$ in interorbital, adipose-lids broad; maxillary reaches opposite front pupil edge, expansion $1\frac{2}{3}$ to 2 in eye, length $2\frac{1}{4}$ to $2\frac{2}{3}$ in head from snout tip; single row of fine, uniform teeth in jaws, on vomer and palatines; interorbital 3 to $3\frac{1}{2}$, convex; preopercle flange with shallow radiating venules and opercle smooth. Gill-rakers 11+30, lanceolate, long, little shorter than gill-filaments.

Scales 35 to 37+43 to 45, arch 2 to $2\frac{1}{5}$ in straight section of lateral line, 10 or 11 scales above, 21 to 23 below; scute depth equals eye; breast densely scaled; circuli 62 to 70, median axis more or less complete. D. I, VIII—I, 23, 1, third spine $2\frac{1}{2}$ to $2\frac{2}{3}$ in total head length, first ray $1\frac{9}{10}$ to 2; A. II—I, 18, 1 to 20, 1, first ray $2\frac{1}{2}$ to $2\frac{3}{4}$; caudal widely forked, slender lobes pointed, equal head; least depth of caudal peduncle $6\frac{1}{2}$ to $6\frac{3}{4}$; ventral $1\frac{2}{3}$ to $2\frac{1}{2}$; pectoral $2\frac{2}{3}$ to $3\frac{1}{2}$ to caudal base.

Back olivaceous or brown, sides and lower surface bright silvery-white. Large neutral-slaty blotch on opercle above but not on opposite side of gill-opening, nearly size of eye. Fins all pale, dorsals and caudal grayish terminally.

Two examples, 240 to 260 mm.

Caranx kalla, Valenciennes.

Six examples, 155 to 185 mm. These agree with examples from Portuguese East Africa, Calicut and the Philippines. The back has light greenish and bluish metallic reflections. All of lower surface bright silvery-white.

Carangoides malabaricus (Schneider.)

Five examples, 140 to 175 mm. Agree with Day's figure.²

Apolectus niger (Bloch.)

Depth $1\frac{1}{2}$ to $1\frac{2}{3}$; head $2\frac{1}{2}$ to $3\frac{1}{2}$, width 2 to $2\frac{1}{5}$. Snout 3 to $3\frac{1}{2}$ from snout tip; eye $4\frac{1}{2}$ to $4\frac{3}{4}$, $1\frac{1}{3}$ to $1\frac{2}{3}$ in snout, $1\frac{1}{3}$ to $1\frac{1}{2}$ in interorbital; maxillary reaches opposite eye, 3 to $3\frac{1}{2}$ in head from snout tip, expansion $2\frac{1}{4}$ to $2\frac{1}{2}$ in eye; single band of fine, simple, conic teeth in each jaw, none on palatines or tongue; interorbital convexly elevated, giving median ridge upward, $2\frac{1}{4}$ to $2\frac{2}{3}$ in head from snout tip. Gill-rakers 6+14, lanceolate.

Scales 85, with about 15 along lateral line slightly thickened or keeled; sometimes single basal stria, circuli complete, 32 to 38. D. II, 43, 1 or 44, 1, third branched ray 2 to $2\frac{7}{8}$ in combined head and body to caudal base; A, II, 37, 1 or 38, 1, third branched ray $2\frac{2}{3}$ to $3\frac{1}{2}$; caudal forked, $3\frac{1}{2}$ to $3\frac{3}{4}$; pectoral $2\frac{2}{3}$ to $2\frac{4}{5}$; least depth of caudal peduncle 5 to $6\frac{1}{2}$ in total head length; ventral $2\frac{2}{3}$ in young.

Purplish-gray on back, young with 5 obscure, broad-dark vertical bands. Iris brownish. Dorsal and anal slaty. Caudal pale brown, edges of all vertical fins slightly dusky. Pectoral brownish.

Four examples, 112 to 168 mm.

LUTJANIDÆ

Lutjanus johnii (Bloch)

Depth $2\frac{1}{2}$ to $2\frac{3}{5}$; head $2\frac{1}{2}$, width 2 to $2\frac{1}{3}$. Snout $2\frac{1}{2}$ to 3 in head from snout tip; eye $5\frac{1}{6}$ to 6, $1\frac{1}{3}$ in snout, equals or slightly greater than interorbital; maxillary reaches opposite eye, expansion $1\frac{1}{2}$ in eye, length $2\frac{1}{2}$ to $2\frac{2}{3}$ in head from snout tip; interorbital 5 to 6, convex.

² *Fishes of India*, 1876, Pl. 50, fig. 2.

Scales 43 or 44 + 5 or 6, 7 above, 12 below, 13 predorsal to occiput, 6 or 7 rows on cheek. D. X, 14, 1, fourth spine 4 in total head length, first ray $2\frac{7}{8}$ to 3; A. III, 8, 1, second spine $3\frac{1}{10}$, first ray $2\frac{2}{5}$; caudal $1\frac{3}{8}$ to $1\frac{3}{4}$, little emarginate; least depth of caudal peduncle $3\frac{1}{3}$ to $3\frac{2}{3}$; pectoral $1\frac{1}{2}$ to $1\frac{3}{8}$; ventral 2.

Pale brown generally, each scale on back and side with deeper brown spot. Lateral line with dusky blotch little larger than eye, largely above lateral line, below junction of spinous and soft dorsal. Fins all pale brownish.

Two examples 240 to 263 mm.

POMADASIDÆ

Pomadasis maculatus (Bloch.)

Depth $2\frac{1}{2}$ to $2\frac{5}{8}$; head 3 to $3\frac{1}{3}$, width $1\frac{7}{8}$. Snout $3\frac{2}{3}$ to $3\frac{1}{2}$; eye $3\frac{2}{3}$ to $3\frac{2}{3}$, equals snout, little greater or equals interorbital; maxillary reaches opposite eye or front pupil edge, 3 in head; interorbital $3\frac{3}{4}$ to 4; broadly convex.

Scales 50 to 54 + 6 or 7, 9 above, 14 or 15 below, 13 predorsal to occiput. D. XII, 14, 1, fourth spine $1\frac{3}{2}$ to 2 in head, first ray, 2 to $2\frac{1}{2}$; A. III, 7, 1, second spine $2\frac{1}{2}$ to $2\frac{1}{2}$, first ray $2\frac{1}{2}$ to $2\frac{3}{8}$; caudal $1\frac{1}{2}$ to $1\frac{1}{4}$, emarginate; pectoral $2\frac{3}{8}$ to $3\frac{1}{4}$ in combined head and body; ventral $1\frac{1}{2}$ to $1\frac{3}{8}$ in head.

Brownish on back with 2 rows of deep brown blotches, largely alternating as 2 lateral series along back. Sides and below whitish, whole body with silvered appearance. Iris pale. Spinous dorsal with large blackish median blotch. Soft dorsal broadly dusted dusky, medially whitish. Caudal brownish. Anal whitish, with dusky blotch in front.

Five examples, 139 to 160 mm.

Pomadasis hasta (Bloch.)

Two examples, 260 mm. These agree with those I reported from Calicut.¹

THERAPONIDÆ

Therapon jarbua (Forsk.)

Depth 3; head $3\frac{1}{2}$, width $1\frac{1}{2}$. Snout $3\frac{2}{3}$; eye $4\frac{2}{3}$, $1\frac{1}{2}$ in snout, $1\frac{1}{2}$ in interorbital; maxillary reaches opposite front eye edge, expansion $1\frac{3}{4}$ in eye, length $2\frac{3}{8}$ in head; interorbital $3\frac{3}{8}$, broadly convex, little elevated.

Scales 80+3, 15 above, 27 below, 22 predorsal to occiput. D, XI, 10, 1, fourth spine $1\frac{1}{2}$ in head, second ray $2\frac{2}{5}$; A, III, 8, 1, third spine $3\frac{1}{2}$, second ray $2\frac{1}{2}$; caudal $1\frac{1}{2}$, emarginate; least depth of caudal peduncle $2\frac{2}{3}$; pectoral $1\frac{7}{8}$; ventral $1\frac{1}{2}$.

Dull brownish above, whitish below. Back with 3 longitudinal deep brown bands, lowest median and paler, extends out on caudal medianly. Fins all more or less dull brown. Spinous dorsal with large blackish apical blotch, paler one posteriorly and soft dorsal with 2 deep gray blotches marginally. Upper caudal lobe with blackish tip and horizontal blackish blotch, lower lobe similar and dark tip less extensive.

One example, 218 mm.

SPARIDÆ

Sparus berda (Forsk.)

Depth $2\frac{1}{2}$; head $3\frac{1}{2}$, width $1\frac{3}{8}$. Snout 3; eye 4, $1\frac{1}{2}$ in snout, $1\frac{1}{2}$ in interorbital; maxillary reaches opposite front pupil edge, $2\frac{2}{3}$ in head; 6 conic canines in front of each jaw; molars 3 series above, little anterior 4 irregular series, below 2 series and little anterior 3 irregular series; interorbital $3\frac{3}{4}$, very slightly convex. Gill-rakers 3+9, short lanceolate.

Scales 46+7, 6 above, 13 below, 16 predorsal; 5 rows on cheek to preopercle ridge, none on flange; basal radiating striæ 10 to 13, apical denticles 42 to 58 with 3 to 8 transverse series of small, weak, basal elements and circuli fine. D. XI, 11, 1, fourth spine $1\frac{1}{2}$ in head, first ray $2\frac{2}{3}$; A III, 7, 1, second spine $1\frac{1}{2}$, first ray $2\frac{1}{5}$; caudal $1\frac{1}{2}$, emarginate, upper lobe little longer; least depth of caudal peduncle $2\frac{3}{8}$; ventral $1\frac{1}{2}$; pectoral $2\frac{3}{4}$ in combined head and body.

¹ Journ., Bombay Natural History Soc., xxx, No. 2, 1925, p. 319.

Dull brownish generally, under surface of both head and body paler to whitish. Each row of scales on back and side with median dull brownish band; on sides of head similar and following scales at longitudinal streaks. Deep brown blotch at suprascapula little larger than eye, conspicuous. Iris pale brown. Fins all brownish, membranes of spinous dorsal with some deeper brown.

One example, 163 mm.

Sparus spinifer (Forsk.)

Depth $1\frac{3}{4}$; head $2\frac{2}{3}$, width 2. Snout 2; eye 3, $1\frac{2}{3}$ in snout, 1 in interorbital; maxillary reaches opposite front eye edge, $2\frac{1}{2}$ in head; interorbital $3\frac{1}{2}$, broadly convex. Gill-rakers 7 + 10, short, lanceolate.

Scales 53 to caudal base, 7 above, 17 below, 20 predorsal. 5 rows on cheek. D. XII, 11, 1, third to sixth spines end in long slender filaments reaching beyond caudal or equal combined head and body without caudal, first ray $2\frac{2}{3}$, in head; A. III, 8, 1, second spine $2\frac{1}{2}$, first ray $2\frac{2}{3}$; caudal $1\frac{1}{2}$, emarginate; least depth of caudal peduncle $2\frac{1}{2}$; ventral $1\frac{1}{10}$; pectoral $2\frac{2}{3}$ in combined head and body.

Back pale brownish, below paler to whitish. Fins all pale brownish. Ventral and anal with little brownish medially and subterminally. Iris whitish. One example 103 mm.

GERRIDÆ

Gerres filamentosus, Cuvier.

Depth $2\frac{1}{2}$ to $2\frac{1}{4}$; head 3 to $3\frac{1}{5}$, width 2 to $2\frac{1}{4}$. Snout 3 to $3\frac{1}{3}$; eye $3\frac{1}{4}$ to $3\frac{3}{8}$, equals snout, $1\frac{1}{2}$ in interorbital; maxillary 3 in head, reaches little beyond eye front, well exposed, expansion $2\frac{2}{3}$ to 3 in eye; interorbital $2\frac{3}{4}$ to $2\frac{2}{3}$ in head, convex, groove scaleless. Gill-rakers 6 + 7, short, lanceolate.

Scales 43 to 45 + 2 or 3, very caducous, 6 or 7 above, 10 or 11 below, 18 to 20 predorsal. D. IX, 10, 1 or 11, 1, second spine prolonged filament reaching base of last soft ray, first ray $2\frac{1}{2}$ to $2\frac{7}{8}$ in head; A. III, 7, 1, third spine 3 to $3\frac{1}{8}$, first ray 2 to $2\frac{3}{5}$; caudal forked, equals head; least depth of caudal peduncle $2\frac{1}{2}$ to $2\frac{4}{5}$; ventral $1\frac{1}{3}$; pectoral $2\frac{1}{2}$ to $2\frac{3}{5}$ in combined head and body.

Back drab-gray, sides and below silvery-white. Iris silvery-white. Dorsals and caudal dusted gray, other fins whitish.

Three examples, 160 to 185 mm.

SCIÆNIDÆ

Otolithus ruber (Schneider).

Depth $3\frac{1}{3}$ to $3\frac{1}{2}$; head 3 to $3\frac{1}{2}$, width $2\frac{1}{2}$ to $2\frac{1}{4}$. Snout $3\frac{2}{3}$ to $4\frac{1}{3}$ in head from snout tip; eye $4\frac{2}{3}$ to $4\frac{1}{2}$, $1\frac{1}{2}$ to $1\frac{1}{3}$ in snout, $1\frac{1}{3}$ to $1\frac{1}{4}$ in interorbital; maxillary reaches opposite hind pupil edge, $2\frac{1}{5}$ to $2\frac{1}{3}$ in head from snout tip; pair of wide-set upper canines and one symphyseal mandibular canine; interorbital $3\frac{3}{4}$ to $3\frac{2}{3}$, broadly convex; preopercle edge membranous. Gill-rakers 9 + 16, lanceolate, slender, equal gill-filaments.

Scales 59 to 62 + 7 to 10 along lateral line. Tubes 49 or 50 to caudal base, 8 or 9 scales above, 9 or 10 below, 30 to 32 predorsal; 12 basal radiating striae and circuli very fine. D. X or XI, 29, 1 or 30, 1, second spine $2\frac{1}{5}$ to $2\frac{1}{4}$ in head from upper jaw tip, first ray $3\frac{1}{5}$ to $3\frac{1}{4}$; A. II, 7, 1, second spine $5\frac{1}{2}$ to $6\frac{2}{3}$, second ray $2\frac{2}{3}$ to $2\frac{2}{4}$; caudal $1\frac{2}{5}$ to $1\frac{1}{2}$, obtusely angular behind; least depth of caudal peduncle $3\frac{2}{3}$ to $3\frac{2}{3}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{3}$; ventral $1\frac{2}{3}$ to $1\frac{2}{3}$.

Back brown, below whitish with more or less silvery reflections on head and body. Iris whitish. Spinous dorsal deep neutral-slate, little paler basally. Soft dorsal grayish, darker all along margins broadly. Caudal brownish. Anal whitish. Paired fins pale. Pectoral often with little brown above and deep neutral-gray in axil.

Four examples, 206 to 238 mm.

JOHNIUS, Bloch.

PENNAHIA, new sub-genus.

Type. *Johnius æneus*, Bloch.

Body strongly compressed, rather short. Head well compressed, deep, bones somewhat cavernous. Eye large, mouth large, lower jaw protruding. Single row of large teeth in each jaw; upper rather curved, well covered with

lips, though front pair of wide-set canines largest; lower laterals largest and close-set, in front—anteriorly few small inconspicuous teeth. Gill-rakers lanceolate, long, 13 on lower limb of first arch. Scales little adherent in preserved examples. Caudal obtuse. Pectoral long.

Distinguished from sub-genus *Johnius* chiefly by the projecting mandible and increased gill-rakers.

(*Pinnah*, the Tamil vernacular.)

Johnius æneus, Bloch.

Depth 3 to $3\frac{1}{10}$; head $2\frac{7}{8}$, width $2\frac{5}{8}$. Snout $3\frac{3}{8}$ to $3\frac{5}{8}$ in head from snout tip, $1\frac{1}{8}$ to $1\frac{1}{2}$ in interorbital; maxillary reaches opposite hind pupil edge, expansion 2 to $2\frac{1}{2}$ in eye, length $2\frac{1}{8}$ in head from snout tip; interorbital $3\frac{1}{8}$ to $3\frac{1}{2}$, broadly convex; hind preopercle edge membranous. Gill-rakers 5 + 13, lanceolate, equal gill-filaments or longest $\frac{3}{8}$ of eye.

Scales 48 to 50 close along and above lateral line to caudal base, 45 to 47 tubular, 9 above, 9 below, 30 to 37 predorsal. D. XI, 23, 1 or 2 + 1, third spine $2\frac{2}{5}$ to $2\frac{1}{2}$ in head from snout tip, first ray $2\frac{4}{5}$ to $3\frac{1}{5}$; A. II, 7, 1, second spine 4, second ray $2\frac{3}{8}$ to $2\frac{7}{8}$; caudal $1\frac{3}{8}$ to $1\frac{1}{2}$, nearly truncate or very slightly concave-convex behind; least depth of caudal peduncle $3\frac{7}{8}$ to 4; pectoral $1\frac{1}{8}$; ventral $1\frac{3}{4}$ to $1\frac{9}{10}$.

Back pale brown, sides and below bright silvery-white. Iris white. Fins pale, lower ones whitish. Spinous dorsal deep dusky-gray, soft dorsal with broad margin of deep brown dots and subbasal longitudinal narrow band.

Two examples 182 and 209 mm.

Sub-genus PSEUDOSCIÆNA, Bleeker.

Type *Pseudosciæna amblyceps*, Bleeker.

Differs from *Johnius* in having an enlarged inner row of mandibular teeth.

Johnius diacanthus (Lacépède).

Depth $3\frac{1}{4}$ to $3\frac{3}{8}$; head 3 to $3\frac{5}{8}$, width 2 to $2\frac{1}{8}$. Snout $3\frac{3}{8}$ to 4; eye 5 to 6, $1\frac{1}{8}$ to $1\frac{3}{8}$ in snout, 1 to $1\frac{1}{8}$ in interorbital; maxillary reaches nearly opposite hind eye edge, expansion $1\frac{1}{2}$ to $1\frac{1}{8}$ in eye, length $2\frac{1}{4}$ to $2\frac{1}{2}$ in head; row of upper large teeth exposed with closed jaws; enlarged inner row of mandibular teeth; 6 pores on lower mandibular surface; interorbital $4\frac{3}{8}$ to $5\frac{1}{4}$, broadly convex; preopercle edge denticulate. Gill-rakers 6 + 9, lanceolate, short, half of gill-filaments.

Scales 56 to 67 + 7 in lateral line, tubes 41 to 43 + 22 to 32, 8 or 9 above, 10 or 11 below, 38 to 40 predorsal; basal striæ 12 to 14, apical denticles 42 to 50 with 7 or 8 series of transverse basal elements and circuli very fine. D. XI, 22, 1, or 23, 1, third spine $2\frac{1}{5}$ to $2\frac{2}{5}$ in head, first ray $3\frac{3}{5}$, A. II, 7, 1, second spine $2\frac{1}{4}$ to $3\frac{1}{10}$, first ray 2 to $2\frac{1}{2}$; caudal $1\frac{3}{5}$ to $1\frac{1}{2}$, obtuse behind; least depth of caudal peduncle $3\frac{1}{2}$ to $3\frac{3}{8}$; pectoral $1\frac{3}{8}$ to $1\frac{7}{8}$; ventral $1\frac{3}{4}$ to $1\frac{7}{8}$.

Soiled drab-gray generally, four slightly deeper, broad bands on back, within each 2 or 3 series of deep dusky blotches size of pupil. Iris yellowish. Dorsal pale, with 5 or 6 blackish blotches. Caudal similar, only blotches at 3 or 4 transverse irregular rows. Ventral neutral dusky. Paired fins same.

Eight examples, 190 to 280 mm. These much more coarsely spotted than in Bleeker's figure of *Pseudosciæna diacanthus*.¹

Depth $2\frac{5}{8}$ to $3\frac{1}{2}$; head 3 to $3\frac{1}{4}$, width $1\frac{1}{2}$ to 2. Snout $3\frac{1}{4}$ to $3\frac{3}{4}$; eye $4\frac{1}{8}$ to $4\frac{3}{8}$, $1\frac{1}{8}$ to $1\frac{3}{8}$ in snout, equals interorbital; maxillary reaches midway or $\frac{2}{3}$ in eye, length from snout tip $2\frac{1}{6}$ to $2\frac{2}{5}$ in head; row of upper teeth each side exposed with closed jaws; inner row of enlarged mandibular teeth; 5 pores in lower mandibular surface; interorbital $4\frac{1}{5}$ to $4\frac{1}{3}$ in head, broadly convex; preopercle edge denticulate. Gill-rakers 4 + 9, short, rudimentary tubercles, greatly less than gill-filaments.

Scales 46 to 50 + 5 or 6 in lateral line, tubes 45 or 46 + 7 or 8, 5 or 6 scales above, 8 or 9 below, 24 to 26 predorsal; 9 or 10 basal radiating

¹ *Atlas Ichth.*, 9, 1877. Pl. (5) 88, Fig. 2.

striæ, apical denticles 57 to 62 with 13 to 15 series of basal elements and circuli very fine. D. XI, 27, 1 to 30, 1, third spine 2 to $2\frac{1}{2}$ in head, first ray 3 to $3\frac{1}{2}$; A. II, 7, 1, second spine $3\frac{1}{4}$ to $3\frac{3}{8}$, third ray 2 to $2\frac{2}{3}$; caudal $1\frac{1}{2}$ to $1\frac{3}{4}$, rounded behind with lower median rays longest; least depth of caudal peduncle $3\frac{1}{4}$ to $3\frac{3}{8}$; pectoral $1\frac{1}{3}$ to $1\frac{1}{2}$; ventral $1\frac{3}{8}$ to $1\frac{1}{4}$.

Drab-gray on back and sides, below white. Opercle neutral to slate-gray, diffuse marginally. Iris pale and spinous dorsal slate-gray. Soft dorsal and caudal pale brown, dusted with neutral-gray marginally. Pectoral and anal soiled whitish. Slate-gray blotch in pectoral axil just behind fin origin. Ventral whitish.

Sixteen examples, 164 to 268 mm.

Sub-genus JOHNIUS. Bloch.

Type *Johnius carutta* Bloch.

Body moderately compressed. Head obtuse. Mouth inferior, lower jaw included. No enlarged inner row of mandibular teeth. Gill-rakers short, usually tubercles or rudimentary.

Johnius carutta Bloch.

Depth $3\frac{2}{5}$ to $3\frac{1}{2}$; head $3\frac{1}{4}$ to $3\frac{1}{2}$, width $1\frac{1}{2}$ to $1\frac{3}{8}$. Snout, $3\frac{2}{5}$ to $3\frac{3}{8}$; eye $4\frac{1}{4}$ to $5\frac{1}{4}$, $1\frac{2}{3}$ to $1\frac{1}{2}$ in snout, $1\frac{1}{3}$ to $1\frac{2}{5}$ in interorbital; teeth on jaws in villiform bands, only upper outer row enlarged; 5 pores on lower mandibular surface; interorbital $3\frac{1}{2}$, broadly convex; preopercle edge membranous. Gill-rakers 4 + 9, short, low tubercles.

Scales 50 to 51 close along lateral line to caudal base, tubes 45 or 46 + 4 or 5, 6 or 7 scales above, 10 below, 25 to 30 predorsal; basal radiating striæ 8 to 12, apical denticles 0 to 22 with 8 transverse series of basal elements and circuli very fine. D. XI, 26, 1 to 29, 1, third spine 2 in head, first ray $2\frac{7}{8}$ to $3\frac{1}{4}$; A. II, 6, 1 or 7, 1, second spine $3\frac{2}{3}$ to $3\frac{5}{8}$, second ray $2\frac{1}{4}$ to $2\frac{2}{3}$; caudal $1\frac{1}{2}$ to $1\frac{3}{4}$, obliquely convex behind with lower median rays longest; least depth of caudal peduncle $3\frac{1}{2}$ to $3\frac{3}{8}$; pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$; ventral $1\frac{3}{4}$ to $1\frac{1}{2}$.

Back drab-gray with deep soiled appearance, undersurface white. Iris pale or yellowish-white. Lateral line with pale median streak, spinous dorsal slate-gray to blackish terminally, soft dorsal and caudal brownish, other fins pale, soiled with brownish.

Two examples, 150 to 230 mm. Known by its pale lateral line, obtuse snout and uniform villiform mandibular teeth.

Johnius glaucus (Day)

Depth $2\frac{4}{5}$ to $3\frac{3}{8}$; head $3\frac{1}{2}$ to $3\frac{1}{4}$; width $1\frac{3}{4}$ to 2. Snout $3\frac{1}{2}$ to $3\frac{3}{4}$; eye 4 to $4\frac{1}{2}$, $1\frac{1}{2}$ to $1\frac{1}{4}$ in snout, 1 to $1\frac{1}{10}$ in interorbital; maxillary reaches opposite eye center, $2\frac{1}{2}$ to $2\frac{1}{4}$ in head; 5 pores on lower mandibular surface; mandibular teeth in villiform band, with inner posterior little larger; interorbital $4\frac{1}{2}$ to $4\frac{1}{4}$, broadly though slightly convex; preopercle edge membranous. Gill-rakers 6 + 12, very short, lanceolate.

Scales 47 to 50 + 5 in lateral line, tubes 44 or 48 + 8, 6 scales above, 8 below, 25 predorsal; basal radiating striæ 7 to 9, apical denticles 18 to 35 with 10 or 11 series of transverse basal elements and circuli very fine. D. XI, 27, 1 to 30, 1, third spine $1\frac{3}{4}$ to 2 in head, first ray $2\frac{1}{3}$ to 3; A. II, 7, 1, second spine $3\frac{1}{2}$ to $3\frac{3}{4}$, second ray $2\frac{1}{2}$; caudal $1\frac{1}{2}$ to $1\frac{1}{2}$, cuneate, rounded behind, lower median rays longest; least depth of caudal peduncle $3\frac{1}{4}$ to $3\frac{1}{2}$; pectoral $1\frac{1}{4}$ to $1\frac{3}{8}$; ventral $1\frac{3}{8}$ to $1\frac{1}{4}$.

Back vinaceous buff to buff below, with undersurface whitish. Iris pale. Spinous dorsal dusky or neutral-dusky terminally. Soft dorsal, caudal and anal brownish terminally. Paired fins pale, pectoral little darker terminally and above. Deep slaty-gray blotch in pectoral axil, close behind fin origin. Opercle neutral-slate.

Three examples, 173 to 203 mm. Known by its pale general colour, which yellowish-gray.

Seiæna dussumieri (Valenciennes.)

Depth $3\frac{1}{2}$ to $3\frac{3}{8}$; head $3\frac{1}{2}$ to $3\frac{1}{4}$, width $1\frac{2}{3}$ to $1\frac{9}{10}$. Snout $3\frac{1}{4}$ to $3\frac{1}{2}$; eye $4\frac{2}{3}$ to 5, $1\frac{1}{2}$ to $1\frac{2}{3}$ in snout, $1\frac{1}{2}$ to $1\frac{2}{5}$ in interorbital; maxillary reaches $\frac{2}{5}$ in eye or to hind pupil edge, from snout tip $2\frac{1}{2}$ to 3 in head; front of

snout below with pores and lower edge with 4 flaps along upper lip; arc of 5 pores around lower symphysis of mandible; symphyseal barb half of eye; interorbital $3\frac{2}{3}$ to $3\frac{3}{5}$ in head, broadly convex. Gill-rakers 4+9, short tubercles, rudimentary. Scales 52 to 57 along laterel line to caudal base, tubes 43 to 47+5 or 6, 8 scales above, 10 to 12 below, 23 to 30 predorsal; basal radiating striæ 10 to 12 and circuli very fine. D. XI, 23, 1 or 24, 1, third spine, $1\frac{1}{4}$ to $1\frac{7}{8}$ in head, first ray $3\frac{1}{5}$ to $3\frac{1}{3}$; A. II, 7, 1, second spine 3 to $3\frac{1}{2}$, third ray $1\frac{7}{8}$ to $2\frac{2}{5}$; caudal $1\frac{2}{3}$ to $1\frac{7}{8}$, obtuse, little obliquely rounded below; least depth of caudal peduncle $3\frac{3}{4}$ to $3\frac{4}{5}$; pectoral $1\frac{1}{5}$ to $1\frac{1}{3}$; ventral $1\frac{4}{5}$ to 2.

Above generally bistre, with soiled or dark dusky appearance, also sides and generally that with silvery, violet and bluish reflections. Along back 4 or 5 obscure, ill-defined dark blotches and sides with dark cloudings. Dusky blotch, more or less conspicuous, about size of eye, at suprascapular region. Iris brown, spinous dorsal neutral-blackish. Soft dorsal, anal and caudal dark brownish. Paired fins pale basally, neutral-brown terminally.

Four examples, 144 to 217 mm.

DREPANIDÆ

Drepane punctata (Gmelin.)

One example 138 mm. Largely silvery, back with gray shade and traces of slightly darker-gray vertical bars.

OSTRACIONTIDÆ

Ostracion gibbosus (Linné.)

Depth $1\frac{2}{3}$; head $3\frac{2}{3}$; carapace width $1\frac{1}{4}$. Snout $1\frac{1}{3}$ in head; eye $2\frac{7}{8}$; interorbital $1\frac{1}{5}$, concave. Dorsal ridge with single compressed spine; lateral ridge with 2 anterior spines at greatest width, posterior larger, besides 2 more subequal posteriorly; suborbital spine broad. Gill opening long as eye. D. II, 8, entirely before anal, first branched ray $1\frac{4}{5}$ in head; A. I, 8, second branched ray $2\frac{1}{10}$; caudal $1\frac{1}{3}$, little convex behind; pectoral $1\frac{2}{3}$.

Pale brown generally. Base of dorsal dusky-brown. Deep brown blotch on spine of dorsal ridge. Brown blotch below pectoral base and one between each of 3 last lateral spines along lower edge of carapace superiorly. Also median lateral neutral brown area on body.

One example, 147 mm.